Shoreline Change Advisory Committee Meeting
Charleston, SC
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State of the Knowledge Report: Estuarine Shoreline Vegetative Buffers

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Overview, Key Definitions

- Buffer and setback rules establish a minimum distance from the shore for primary structures or land uses (e.g. agriculture), and sometimes for secondary structures and uses (sidewalks, gazebos, trails, etc.)

- A "buffer" usually refers to a corridor of vegetation along a shoreline that provides a transition between upland development and nearby receiving waters (EPA, 1993).

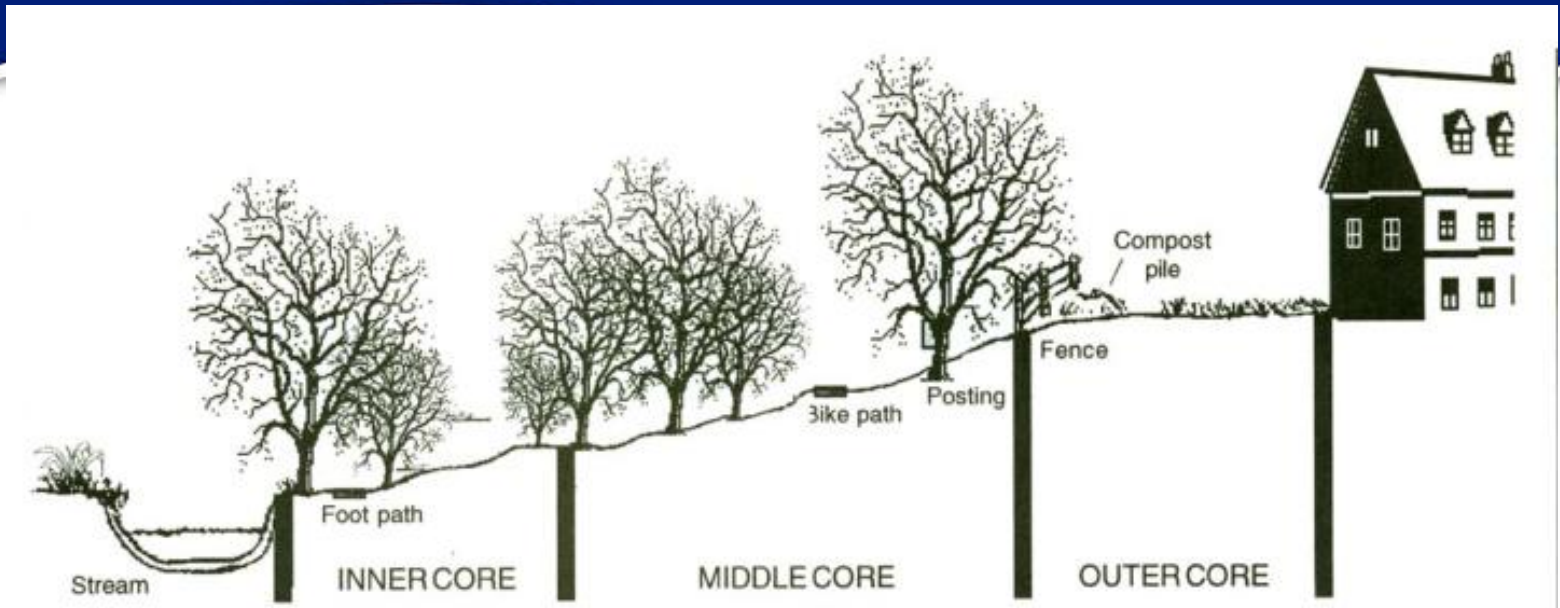
- A "setback" may or may not include requirements related to vegetation or disturbances.

Vegetative Buffer Goals

- Improve water quality
- Protect important / unique shoreline habitats
- Enhance aesthetics
- Provide opportunities for recreation and public access
- Mitigate shoreline hazards (erosion, flooding, storm surge)

Photo courtesy of Laura Lee, Clemson Extension

Different Designs for Different Goals



CHARACTERISTICS	INNER CORE	MIDDLE CORE	OUTER CORE
Width	25 feet, plus wetlands and critical habitats	25 to 50 feet, depending on stream order, slope, and 100 year floodplain	25 foot minimum setback to structures
Vegetative Target	Undisturbed forest. Reforest if grass	Managed forest, some clearing allowable	Forest or turf
Allowable Uses	***Very Restricted*** e.g., flood control, utility right of ways, footpaths, etc.	***Restricted*** e.g., some recreational uses, some stormwater practices, bike paths, tree removal by	***Unrestricted*** e.g., residential uses including lawn, garden, compost, yard wastes, most stormwater practices

Figure 1: Schematic of a Three-Zone Buffer

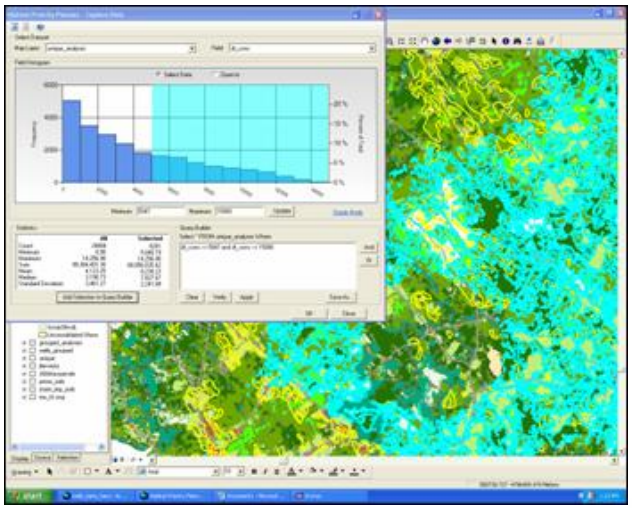
(Shueler, 1994)

Status and Trends in SC

- Ocean shoreline = 187 mi
- Estuarine shoreline = 2875 mi

- Assessing estuarine buffers in SC
  - Partnering with NOAA CSC
  - Using Habitat Priority Planner and C-CAP land cover classes
  - Identify connectivity, vulnerability, and change over time

- Data gap identified



Recent Reports & Recommendations

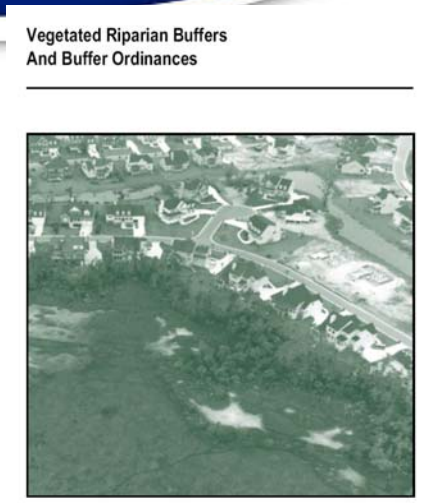
SC State Buffer Initiative Team (1998) formed to evaluate SC buffer practices and make recommendations for improvement

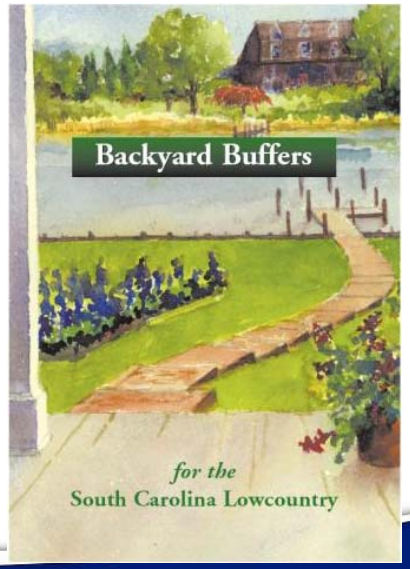
Statewide Riparian Forest Buffer Task Force (1999) identified the status of buffer protection and programs in SC and across the nation and made recommendations to the state for future buffer use

SC General Assembly Legislative Audit Council's review of DHEC recommended: "The General Assembly should amend state law to require riparian buffers along SC streams, rivers, and lakes" (SC General Assembly LAC, 2007)

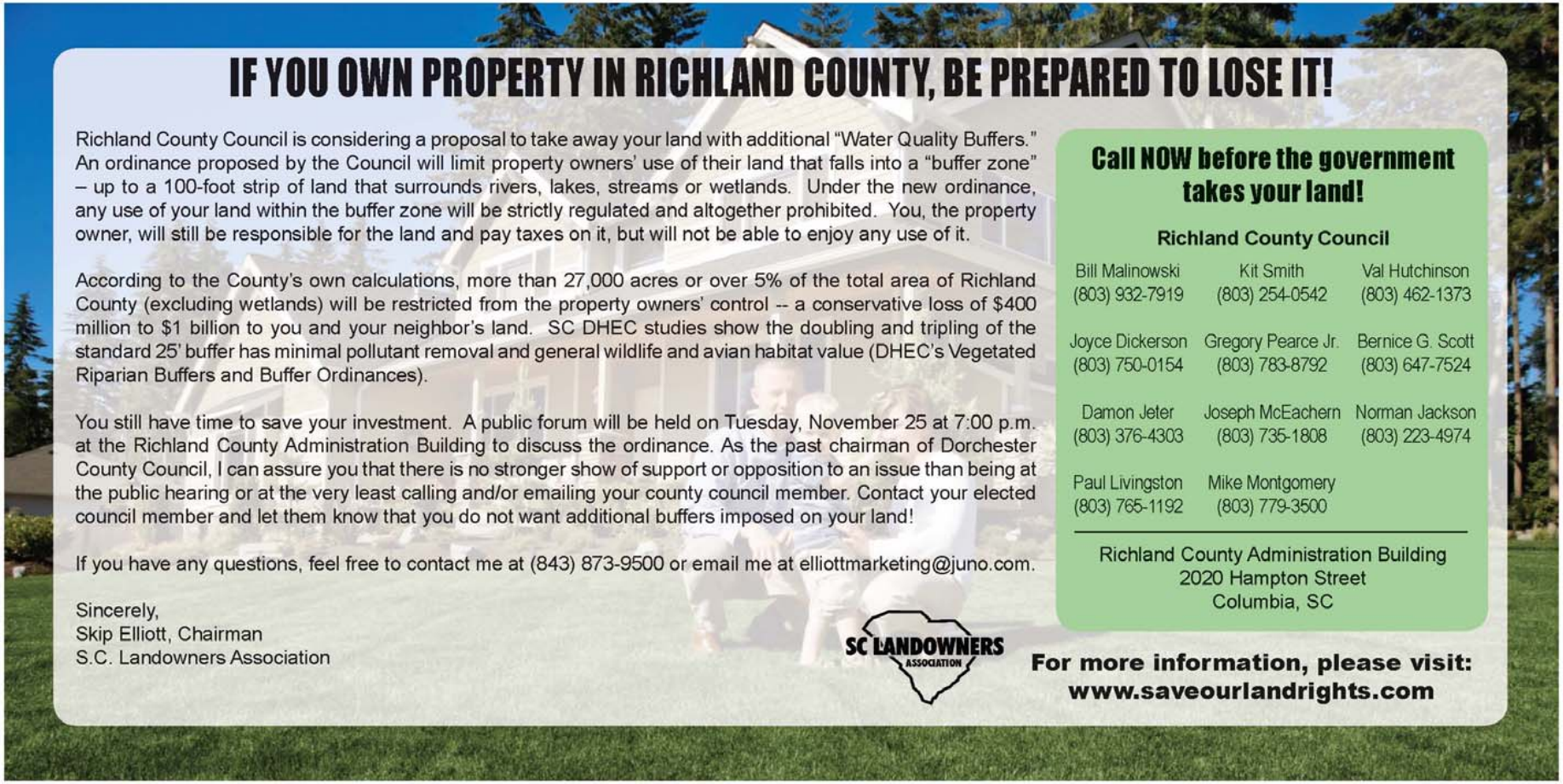
SC Buffer Research & Resources

- Vandiver (2005) tested ~10, 25, & 40 ft wide buffers in Charleston, SC and found 1) wider was better, 2) use plants with > 4 ft. roots; 3) comprehensive stormwater management; and 4) education is key
- Evaluation of vegetative filter strips to control urban runoff & recommended 50 to 100 ft buffers (McCutcheon et al., 2000)
- Buffers used in TMDL projects and NPS program
- *Critical line buffer ordinances: Guidance for coastal communities* (Halfacre-Hitchcock and Hitchcock, 2007)
- Clemson Extension – *Riparian area management handbook for agricultural and forestry lands* and Master Gardeners





And buffers in the news…..



IF YOU OWN PROPERTY IN RICHLAND COUNTY, BE PREPARED TO LOSE IT!

Richland County Council is considering a proposal to take away your land with additional "Water Quality Buffers." An ordinance proposed by the Council will limit property owners' use of their land that falls into a "buffer zone" – up to a 100-foot strip of land that surrounds rivers, lakes, streams or wetlands. Under the new ordinance, any use of your land within the buffer zone will be strictly regulated and altogether prohibited. You, the property owner, will still be responsible for the land and pay taxes on it, but will not be able to enjoy any use of it.

According to the County's own calculations, more than 27,000 acres or over 5% of the total area of Richland County (excluding wetlands) will be restricted from the property owners' control -- a conservative loss of $400 million to $1 billion to you and your neighbor's land. SC DHEC studies show the doubling and tripling of the standard 25' buffer has minimal pollutant removal and general wildlife and avian habitat value (DHEC's Vegetated Riparian Buffers and Buffer Ordinances).

You still have time to save your investment. A public forum will be held on Tuesday, November 25 at 7:00 p.m. at the Richland County Administration Building to discuss the ordinance. As the past chairman of Dorchester County Council, I can assure you that there is no stronger show of support or opposition to an issue than being at the public hearing or at the very least calling and/or emailing your county council member. Contact your elected council member and let them know that you do not want additional buffers imposed on your land!

If you have any questions, feel free to contact me at (843) 873-9500 or email me at elliottmarketing@juno.com.

Sincerely,
Skip Elliott, Chairman
S.C. Landowners Association

SC LANDOWNERS ASSOCIATION

Call NOW before the government takes your land!

Richland County Council

Bill Malinowski (803) 932-7919	Kit Smith (803) 254-0542	Val Hutchinson (803) 462-1373
Joyce Dickerson (803) 750-0154	Gregory Pearce Jr. (803) 783-8792	Bernice G. Scott (803) 647-7524
Damon Jeter (803) 376-4303	Joseph McEachern (803) 735-1808	Norman Jackson (803) 223-4974
Paul Livingston (803) 765-1192	Mike Montgomery (803) 779-3500	

Richland County Administration Building
2020 Hampton Street
Columbia, SC

For more information, please visit: www.saveourlandrights.com

State-Level Buffer Policies

- Survey of 36 state and local programs
  - 1) 20 to 200 ft buffer range; 2) 65% variable width; 3) >80% had guidance for buffer vegetation and disturbance; 4) >80% strong citizen support; and 5) >90% thought buffers had neutral to positive effect on land value (Heraty, 1993)
- SC stormwater guidance
  - 20 ft buffer between golf course and water, and recommends 35 to 50 ft buffer to protect water quality and quantity
  - Special Area Management Plans (SAMPs)
    - The Ashley River SAMP included a buffer policy (100') to preserve historic shoreline views (allows 30% clearing).
- No statewide buffer law or rules in SC

State-Level Buffer Policies

- GA – Requires 50 ft buffers under the Coastal Marshlands Protection Act
  1) Area must remain undisturbed, naturally vegetated (except passive recreation, access);
  2) Goal of no more than 15% impervious cover in upland project area;
  3) Allows exceptions and hardships.

  - "Model Coastal Riparian Buffer Ordinance" for Georgia's local gov'ts - clarifies local government's role in state-required buffers and provides a model ordinance (University of Georgia River Basin Center, 2007)

- NC, see prior talks


Photo courtesy of Lisa Vandiver.


Photo courtesy of Dr. Fred Holland.

Local Buffer Ordinances

County

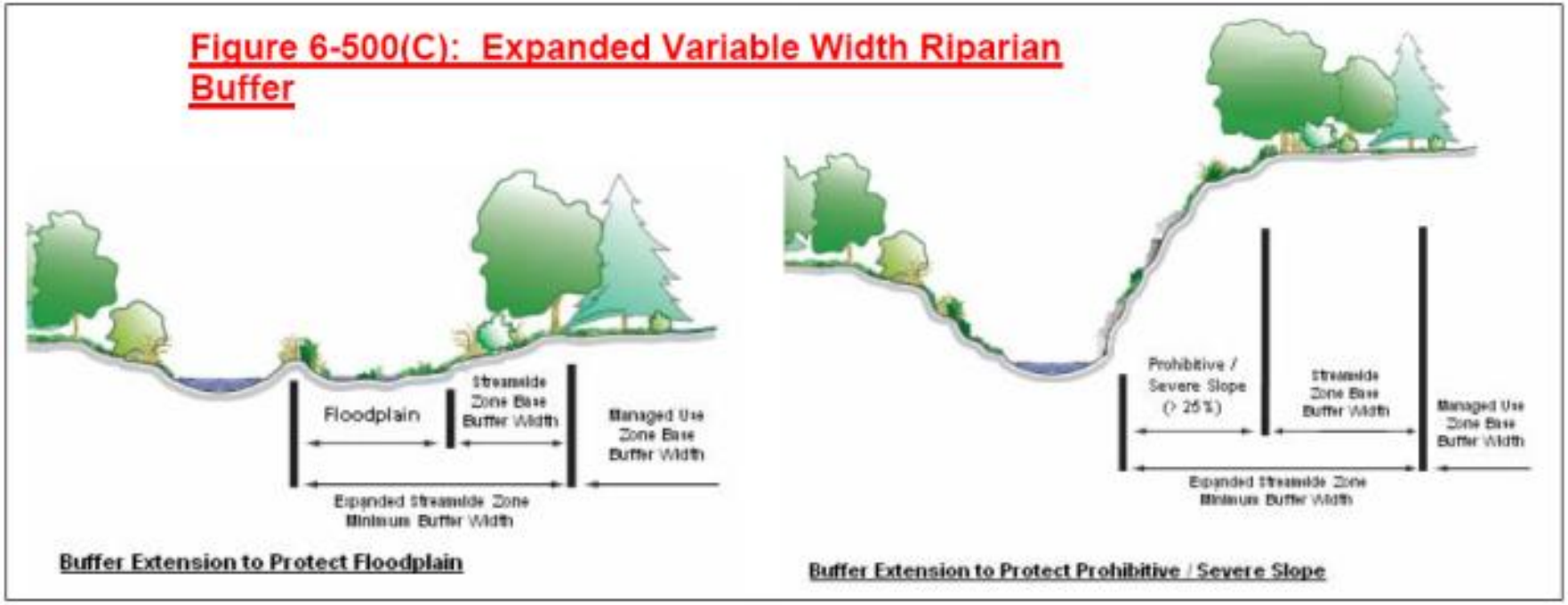
- Beaufort - 50 ft buffer along tidal water and wetlands
- Charleston – 15 to 35 ft buffer for wetland, waterways, and OCRM critical line
- Dorchester – Ashley River Historic District Overlay Zone, ≥ 200 ft buffer along the Ashley River Corridor
- Georgetown – 15 ft setback from salt water marsh wetland line

City and Town

- City of Beaufort – ≥ 25 ft (< 1 acre development) or average 50 ft (> 1 acre development) critical line buffer and the city ordinance requires landscape provisions
- Charleston – 25 ft critical line buffer based on land use and zoning
- Town of Mt. Pleasant – 15 to 20 ft for select waterways (Cooper and Wando) and based on land use (SR= 25 ft, MR= 50 ft, and NR= 75)

Local Buffer Ordinances (cont'd)

- Town of Hilton Head – 20 to 30 ft buffers based on land use
- Town of Bluffton – 0 to 25 ft buffer
- Rock Hill – 50 ft buffer for streams and wetlands and has variable buffers along select waterways and ordinance is detailed and based on Shueler's three managed zones



Water Quality Benefits

- Factors that effect buffer's usefulness are **slope, width**, rainfall, soils, water table depth, vegetation, pollutant concentration, land use, path of runoff water on landscape
- 40 studies reviewed found buffers remove N and width was the major factor (USEPA, 2005)
- 140 publications reported lower limit buffer width was 50 to 100 ft (Wenger and Fowler, 2000)
- 36 programs surveyed nationally and found 100 ft median buffer width (Hearty *in Shueler*, 1995)
- 15 ft removes ~ 50% pollutants and > 80 ft removes ~ 80% pollutants (Desbonnet et al., 1994)
- 25 ft removes >80% N, P, fecal coliform in surface water (Vandiver, 2005)

Habitat Benefits

- Buffers maintain local ecosystems and promote regional biodiversity
  - Mixed habitats increase diversity
  - Wildlife travel corridors
  - Escape from flooding
  - Provide breeding/nesting sites
  - *Edge effects*


Photo courtesy of University of Minnesota.

- Other factors…
  - Plant selection (weed control and non-invasives)

- Data need for SC

Hazard Mitigation Benefits

- Reduce flooding
  - Reduce water velocity and store water in soils
  - Mitigate property destruction
  - Storm surge - waves
- Setback for erosion (and reduces erosion)
- Data need for SC

Shem Creek in Mt. Pleasant, SC

Recreational Benefits

- Increase public access
  - Bike & foot paths
- Some recreation can reduce buffer encroachment or excessive trimming
- Visual diversity and aesthetic appeal
- Data need for SC

I'on community in Mt. Pleasant, SC

Economic Benefits

- Wisconsin residents willing to pay $1400 to $1600 for lots in development with community-owned buffer (Qiu, Prato, and Boehm, 2006)
- Open space was $1000 to $4400 per household in Maryland (Irwin, 2002)
- Homes with view of forest were 5% more expensive than without view (Tyrvainen and Miettinen, 2000)
- Data need for SC – vs. open water views…

Recent Buffer-Related Initiatives

- Beaufort County targeting grassed lawns leading to impacted waterways (303 d list) for buffer incentive program (Dan Ahern, pers. comm., 2008).

- Richland County proposing a 100 ft buffer ordinance to protect rivers, lakes, streams, and wetlands (Miller, pers. comm., 2008).

- Clemson Master Gardener's are maintaining the Beaufort County River Buffer Project along the marsh to slow runoff, filter pollutants, provide habitat, and maintain natural beauty at the site (Rose, pers. comm., 2008)

Photo courtesy of Laura Lee, Clemson Extension

Final Thoughts

- A number of recommendations for buffers, examples in other states
- Science to support buffer designs incomplete
  - Need to know spatial extent of existing buffers
  - Need to better understand ecological and economic benefits
- Known benefits for buffers (erosion & flood control, water quality, habitat & aesthetic quality, natural setbacks, etc.)
  - Wider is better
  - Some is better than none
- Different designs to meet local needs and flexibility
- Education needed

Questions…..

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Photo courtesy of Laura Lee, Clemson Extension

Buffer Widths

	Buffer Width (ft)			
% Removal	Sediment	Total Suspended Solids	Nitrogen	Phosphorus
50	2	7	12	16
60	7	20	30	39
70	23	66	76	115
80	82	197	197	279
90	295	656	492	820
99	984	2297	1148	1804